Claims

1. A method of directing a cellular immune response against an HIV-infected cell in a mammal, said method comprising administering to said mammal an effective amount of therapeutic cells, said therapeutic cells expressing a membrane-bound, proteinaceous chimeric receptor comprising (a) an extracellular portion which includes a fragment of CD4 which is capable of specifically recognizing and binding said HIV-infected cell but which does not mediate HIV infection and (b) an intracellular portion which is capable of signalling said therapeutic cell to destroy said receptor-bound HIV-infected cell.

2. The method of claim 1, wherein said CD4 fragment consists of amino acids 1-394.

3. The method of claim 1, wherein said CD4 fragment consists of amino acids 1-200.

4. The method of claim 1, wherein said CD4 fragment is separated from said intracellular portion by the CD7 transmembrane domain shown in Fig. 26.

5. The method of claim 1, wherein said CD4 fragment is separated from said intracellular portion by the hinge, CH2, and CH3 domains of the human IgG1 molecule shown in Fig. 25.

6. The method of claim 1, wherein said CD4 fragment is separated from said therapeutic cell membrane by at least 48 angstroms.

7. The method of claim 6, wherein said CD4 fragment is separated from said therapeutic cell membrane by at least 72 angstroms.

8. The method of claim 1, wherein said intracellular portion is the signal-transducing portion of a T cell receptor protein, a B cell receptor protein, or an Fc receptor protein.

9. The method of claim 8, wherein said T cell receptor protein is ζ.

10. The method of claim 1, wherein said therapeutic cells are selected from the group consisting of: (a) T lymphocytes; (b) cytotoxic T lymphocytes; (c) natural killer cells; (d) neutrophils; (e) granulocytes; (f) macrophages; (g) mast cells; (h) HeLa cells; and (i) embryonic stem cells (ES).

11. A cell which expresses a proteinaceous membrane-bound chimeric receptor, said receptor comprising (a) an extracellular portion which includes a fragment of CD4 which is capable of specifically recognizing and binding said HIV-infected cell but which does not mediate HIV infection and (b) an intracellular portion which is capable of signalling said cell to destroy a receptor-bound HIV-infected cell.

12. The cell of claim 11, wherein said CD4 fragment consists of amino acids 1-394.

13. The cell of claim 11, wherein said CD4 fragment consists of amino acids 1-200.

14. The cell of claim 11, wherein said CD4 fragment is separated from said intracellular portion by the CD7 transmembrane domain shown in Fig. 26.

15. The cell of claim 11, wherein said CD4 fragment is separated from said intracellular portion by the hinge, CH2, and CH3 domains of the human IgG1 molecule shown in Fig. 25.

16. The cell of claim 11, wherein said CD4 fragment is separated from said therapeutic cell membrane by at least 48 angstroms.

17. The cell of claim 16, wherein said CD4 fragment is separated from said therapeutic cell membrane by at least 72 angstroms.

18. The cell of claim 11, wherein said intracellular portion is the signal-transducing portion of a T cell receptor protein, a B cell receptor protein, or an Fc receptor protein.

19. The cell of claim 18, wherein said T cell receptor protein is ζ.

20. DNA encoding a chimeric receptor of claim 11.

21. A vector comprising the chimeric receptor DNA of claim 20.